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IS 13126 (1991): Silicon carbide chills [MTD 14: Foundry]

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सिलिकन कार्बाइड द्रुतशीतक – विशिष्टि

Indian Standard

SILICON CARBIDE CHILLS — SPECIFICATION

UDC 621·744·074 : 666·762·852

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

August 1991

Price Group 1

Foundry Sectional Committee, MTD 14

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Foundry Sectional Committee had been approved by the Metallurgical Engineering Division Council.

Silicon carbide chills are used in cast iron foundry mainly for densening the structure of material. However, this material does not appreciably increase the hardness of the casting as compared to cast iron chills.

The number of re-use of silicon carbide chills depends upon the intricacy of casting shape.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

SILICON CARBIDE CHILLS — SPECIFICATION

1 SCOPE

This standard covers the requirements of silicon carbide chills for use in foundries.

2 REFERENCES

The following Indian Standards are necessary adjuncts to this standard:

IS No.	*Title*
1387 : 1967	General requirements for the supply of metallurgical materials (*first revision*)
1528	Methods of sampling and physical tests for refractory material
(Part 1) : 1980	Determination of pyrometric cone equivalent (PCE) of softening point (*second revision*)
(Part 4) : 1974	Determination of cold crushing strength (*first revision*)
(Part 7) : 1974	Method of sampling and criteria for conformity (*first revision*)
(Part 12) : 1974	Determination of bulk density (*first revision*)

3 CHEMICAL REQUIREMENTS

The silicon carbide chills, when analysed in accordance with the method prescribed in Annex A, shall conform to the following requirements:

Characteristic	*Requirement, Percent by Mass*
SiC	90 ± 5
SiO_2 (*Max*)	10
Al_2O_3	3 to 4
Fe_2O_3 (*Max*)	1

4 PHYSICAL REQUIREMENTS

The physical requirement of silicon carbide chills shall be as given below:

Characteristic	*Requirement*	*Reference*
i) Bulk density, gm/cc, *Min*	2·4	IS 1528 (Part 4) : 1974
ii) Cold crushing strength (kgf/cm^2)	350 to 600	IS 1528 (Part 12) : 1974
iii) PCE (Softening point), *Min* ASTM Cone No.	36	IS 1528 (Part 1) : 1980
iv) Service temperature, °C	1 350-1 500	—
v) Bonding	Refractory	—

5 TOLERANCES

Dimensional Tolerances — ±2 percent or ±1 mm whichever is greater or as specified in the drawing

NOTES

1 The dimensions shall be as agreed to between the supplier and the purchaser.

2 The dimensional tolerances shall be the dimensions without specified tolerances. Wherever the tolerances are specified in the drawings, they shall be maintained.

6 SAMPLING

The samples shall be drawn in accordance with IS 1528 (Part 7) : 1974.

7 PREPARATION OF TEST SPECIMENS

In case of rectangular shaped chill, the chill itself can be used as a sample. In case of odd shapes, a test piece of 50 mm cube cast and processed similar to chill shall be supplied with each batch for testing.

8 SUPPLY OF MATERIAL

The general requirements for the supply of chills shall be according to IS 1387 : 1967.

9 STORAGE

The chills should be properly stored to keep them clean and dry.

10 PACKING

Unless specified otherwise, the material shall be supplied in jute/polythene/lined/canvas bags of suitable size in quantity not more than 50 kg gross.

11 MARKING

Each silicon carbide chill shall be clearly marked with the following information:

a) Manufacturer's name,
b) Users drawing number, and
c) Shelf life.

ANNEX A

(*Clause* 3)

ANALYSIS OF SILICON CARBIDE

A-1 The sample of fineness 150 micron or less is dried in an oven at 105-110°C to remove the moisture in the sample.

A-2 About 0·5 g of dried sample is fused with fusion mixture (potassium and sodium carbonate) in a muffle furnace from dull hot to red hot gradually till the sample is fused to semi-paste. In case of doubt a pinch of sodium or potassium nitrate is added and fusion is continued for a while.

A-3 When the fused mass is cooled, extract the mass with hot water and add silica mixture ($HCl + HNO_3 + H_2SO_4$) and kept for baking till silica gets converted to meta silicic acid which is indicated by white dense fumes of H_2SO_4. Then cool and add dil. HCl (1 : 1) and boil for 10 minutes. Cool and filter through Whatman 41 filter paper and wash with hot dil. HCl and hot water alternatively till free of iron.

A-4 The precipitate is dried and ignited in a Muffle furnace at 950-1 000°C till constant weight and HF treatment is done for purification and SiO_2 is calculated from it.

A-5 The filtrate is boiled to remove excess of acid and then cooled. Add 1 to 2 g of NH_4Cl and make it up to *p*H (7·5-8) mixing NH_4OH to precipitate combined oxide that is ($Al_2O_3 + Fe_2O_3$). Warm the solution and cool. Filter through Whatman 41 filter paper and wash with cold water. The precipitate is dried and ignited and weighed as combined oxide.

A-6 The residue is redissolved in dil. HCl (1 : 1) and Fe_2O_3 is calculated by stannous chloride reduction method using $K_2Cr_2O_3$ with diphenylamine as indicator.

A-7 From the total percentage of combined oxide subtract the percentage of Fe_2O_3 which gives Al_2O_3.

A-8 The filtrate may be proceeded for CaO and MgO by precipitating as calcium oxalate and ammonium phosphate mixing ammonium oxalate and dibonic ammonium phosphate respectively.

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